

Scaling Up Agricultural Adaptation through Insurance:

Bringing together insurance,
big data and agricultural innovation

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Germany

BACKGROUND PAPER



RESEARCH PROGRAM ON
Climate Change,
Agriculture and
Food Security



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1. Summary

Climate change is expected to increase the risk from extreme climate events such as drought, flooding and heat waves, in much of the developing world (IPCC 2014). Increasing erratic weather and climate shifts already threaten tenuous agricultural-based livelihoods and will further disrupt farmers' traditional risk avoidance and coping mechanisms at household and community levels. Extreme events erode farmers' livelihoods through loss of productive assets, while the uncertainty associated with climate variability is a disincentive to investing in agricultural innovation. The impacts of climate-related risk contribute to poverty traps that reinforce already vulnerable livelihoods, impeding the kinds of transformation that smallholder agriculture needs in order to adapt to climate change.

Public and private investment can play an instrumental role in supporting new forms of innovation to enhance farmers' ability to adapt to climate change. In so doing, it may help generate the necessary growth that acts as a principal mechanism for poverty reduction. Risk-reduction through insurance innovation can play a part in stimulating the entrepreneurship and innovation needed for agricultural development, helping overcome reliance on public funds to address market failure. However, despite the existence of many creative initiatives, the global insurance market has still not opened up to protect the lives and livelihoods of the world's most vulnerable. Nevertheless, it has started to be recognized that leveraging both the power and flexibility of the markets alongside the insights of science will really help agriculture adapt to the growing risks of climate change. New innovations and partnerships have great potential to overcome these challenges and elevate the role of index insurance in smallholder adaptation to a new level.

Agricultural insurance is an important tool that can help address the risks associated with climate change by protecting farmers against extreme events and unlocking productive opportunities that help them increase their resilience and cope with other shocks. Traditional insurance relies on an assessment of physical loss and adjustments, which makes the process prohibitively expensive and protracted for often-dispersed smallholder farmers. As a lower cost and innovative alternative, Index-based agricultural insurance is gaining increasing attention as a promising tool for adapting smallholder agriculture to climate risk.

In the case of index insurance, pay-outs are triggered not by observed crop losses, but rather when an index – such as rainfall or average yield – falls above or below a pre-specified threshold. As a result, costs are reduced because payments can be automated whenever weather and/or yield data indicate that a payment should be triggered. Since the late 1990s, index insurance feasibility studies and pilot projects have been undertaken in a wide variety of settings throughout the developing world. Scaling has been most successful in countries that include India, China, Zambia, Kenya, Mexico, Brazil and Ethiopia.

There has been growing emphasis on climate insurance in the UNFCCC processes. 2015 was a landmark year for climate risk transfer due to the prominent role it was given within the Sendai Framework for Disaster Risk Reduction, the COP21 Paris Agreement and the commitment under the G7 InsuResilience initiative aiming to insure an additional 400 million vulnerable individuals against climate risks by 2020. Launched in Elmau under the German G7 presidency, the latter is supported by commitments of 550 million USD on

behalf of the G7 partners, the EU and the Netherlands, of which 190 million USD are provided by the German Federal Ministry for Economic Cooperation and Development alone.

Our belief that index insurance holds significant potential to reduce climate risk for small-holder farmers through its *protection* and *promotion* roles, significantly improving the welfare of farm households, is why we are bringing together experts from across the insurance, agriculture and climate change sectors to find the best ways to scale-up index insurance schemes as a key climate change adaptation action.

This background paper includes a short introduction to index-based agricultural insurance. The bulk of the paper (Section 3), however, focuses on the challenges and opportunities to scaling up agricultural adaptation through insurance. Based on a review of secondary literature, interviews with key informants and the authors' experience, we highlight a number of issues that warrant concerted multi-stakeholder attention and action in order to realize the potential of index insurance as a key component of climate change adaptation.

- **Data availability** - *Absence of data is a key hurdle that needs to be addressed for index insurance to achieve scale; new opportunities are arising through Information and Communication Technology (ICT) and the data revolution.*
- **Targeting and design of insurance** - *For index insurance to achieve scale it needs to be appropriately targeted, this means recognizing heterogeneity in farmer populations and designing insurance products that best meet the needs of specific farmer-groups.*
- **Distribution channels and use of technology** – *It is importance to market the insurance through existing distribution channels that farmers use and trust, such as microfinance or input suppliers; opportunities also exist to market insurance at the micro-, meso- and macro-levels and to take advantage of mobile phone technology.*
- **Bundling index insurance with climate smart agriculture and others types of insurance** – *There is growing evidence that bundling index insurance with credit, climate smart technologies and/or life insurance can make it a real value-adding proposition for farmers and increase farmer demand.*
- **Regulatory environment** - *Establishing a legal and regulatory environment for enforcing contracts that both buyer and seller can trust is a fundamental prerequisite for index insurance; opportunities are provided by innovative public-private partnerships that bring together government, local insurers and international reinsurers.*
- **Enabling environment and smart subsidies** – *Careful attention needs to be paid to how an enabling environment for farmer up-take of index insurance can be built in order to ensure confidence in the product; in some cases smart subsidies may be required alongside government commitment to regulatory reform to enable index insurance to be a tool of poverty reducing potential.*
- **Impact evaluation** – *Ex-post impact studies are needed to demonstrate impact, including whether and how index insurance has transformed farmers' livelihood strategies and incomes; evidence is also needed on the impacts on financial institutions and agro-dealers, including whether it has enabled business expansion by serving more small farmers.*

- **Capturing the full value chain** – *Insurance has tended to be offered largely to farmers but there are opportunities to offer insurance to actors who are engaged in non-farm activities such as input suppliers and traders.*

We believe that the insurance, climate change and agricultural research communities have a real opportunity to work together to ensure that the challenges to scaling up index insurance are overcome and that insurance becomes a key feature of climate risk management.

2. Index-based agricultural insurance

Traditional indemnity-based insurance, sometimes referred to as Multi-Peril Crop Insurance, requires farm visits to verify loss claims. Although it has been effective for large-scale farms, *adverse selection* (the tendency for insurance to be purchased preferentially by farmers with greater risks, increasing premiums and payouts), *moral hazard* (the incentive for farmers to neglect good risk management in order to receive payouts), and high transaction costs and processing delays associated with verifying claims have made this type of insurance generally unfeasible for implementation at scale for smallholder farmers.

Index insurance is an innovation that triggers payouts based on an index that is correlated with agricultural losses, rather than on actual losses. Indexes include rainfall during a defined period, yields sampled over a larger region, and remote sensing of vegetation conditions or flood extent. Index insurance seeks to cover specific threats that can be captured by the selected index, generally at aggregate scales rather than at the level of individual farms. Index-based insurance can reduce the costs of administering and delivering insurance and remove many of the negative incentive problems that have plagued agricultural insurance. It is also a promising approach for underwriting the costs of relief agencies, and providing a fast and reliable source of funding once an insured catastrophe has occurred.

Index insurance is also an opportunity to establish innovative public-private-partnerships. Until recently, the private sector played only a minor role in insuring farmers in the developing world against agricultural risks. Responsibility for providing insurance was largely in the hands of government. Non-governmental organizations (NGOs) and farmer associations have had to step in to help fill a void, either by organizing insurance themselves or engaging in relief efforts once disasters occurred. Index insurance has attracted increasing private sector engagement due to a shift towards more public-private and nonprofit-private partnerships in the delivery of insurance.

Since its introduction to the agricultural sector in the mid-1990s, index insurance has largely overcome some of the major obstacles to insuring smallholder farmers in the developing world. But it also introduces the challenge of *basis risk*: the difference between the farmer's actual losses and the expected payout on an insurance contract. Index-based insurance has led to a resurgence of effort to develop insurance for smallholder farmers and pastoralists in the developing world. While index insurance is not a complete or stand-alone solution for all agricultural risks, it is being used to achieve several specific risk management objectives.

Firstly, index insurance can protect farmers' livelihoods. An uninsured shock, such as a drought, can have detrimental long-term livelihood consequences through direct damage to crop and livestock productivity. Farmers employ a range of coping strategies that protect against the possibility of catastrophic loss in the event of an extreme event and include liquidating productive assets, defaulting on loans, migration, withdrawing children from school to work on-farm, reducing nutrient intake, and over-exploiting natural resources.

These coping strategies can, however, also trap households in poverty. Studies of drought-prone areas in India and Burkina Faso suggest that farmers may sacrifice 12-15% of average income to reduce risk (Gautam et al., 1994). There is also a danger that production losses contribute in local agricultural employment and wages, and non-farm income (Hazell and Hess, 2017). Index insurance can help protect farmers' productive assets. For example, in northern Kenya, index-based insurance payouts for livestock following a drought in 2011 reduced distress sales by 64% among better-off pastoralist households. Among poorer households, receiving an insurance pay-off reduced the likelihood of rationing food intake by 43% (Janzen and Carter 2013).

Secondly, index insurance can promote farmers' livelihoods by enhancing the adoption of climate smart agricultural technologies and practices, and facilitating farmers' access to market opportunities. The risk of an infrequent but severe shock can act as a significant disincentive to farmers investing in climate-adapted seeds, fertilizer and other agricultural technologies. For example, a farmer might be able to increase yields by using high quality seeds. But most of the things farmers can do to increase productivity require taking chances. Farmers may worry about making that investment because while yields of these purchased seeds may be higher in good years compared to farmers re-cycled seed, they may still be losses in a bad drought year. Risk-averse farmers, in general, prefer to spend less on agro-inputs when confidence about the returns of such investments is low.

Risk also has a negative impact on the development of rural financial services and supply chains, including the availability of credit to smallholder farmers, in ways that further constrain opportunities and reinforce poverty at the farm level. Farmers who lack savings would need a loan to invest in more productive strategies. However, if banks think that farmers are at high risk, they may not be willing to make those loans in the first place (IRI 2013). Risk can be mitigated by insurance. Agricultural insurances against yield loss allow risk to be transferred to agricultural insurance markets and thus increase the confidence of farmers and facilitate their investment in agricultural production in general. If insurance can address climate risks and thereby increase banks' willingness to make loans, and help farmers feel comfortable making those additional investments and using new technologies, then farmers could take advantage of productive opportunities that bring them higher income in most years.

Insurance can, hence, build resilience by not only providing a payout in bad years to help farmers protect their assets but also by unlocking opportunities to increase productivity in the better years (IRI 2013). For example, evaluation of the R4 Rural Resilience Initiative in Ethiopia showed that insurance allowed farmers to increase their savings, increase the number of draught animals, access more credit, and invest more in inputs such as fertilizers

and improved seeds (Madajewicz et al. 2013). The ACRE (Agriculture and Risk Enterprise Ltd., formerly *Kilimo Salama*) initiative reported that insured farmers invested 19% more in farm productivity, resulting in 16% more earnings compared to their uninsured neighbours (IFC, 2013). Further evidence that index insurance enhances adoption of improved production technologies comes from evaluations and experimental studies with farmers in Bangladesh, India, Ghana, Mali, Burkina Faso, Senegal, Ethiopia and Zambia.

Evidence also suggests index insurance can significantly improve the welfare of farm households. For example, among pastoralists in northern Kenya, holding insurance increased the probability of next-season herd size remaining above an estimated poverty trap threshold in both drought and non-drought years; and significantly decreased the probability that children would be severely malnourished during a drought year (Cissé and Ikegami 2016). In Malawi, Nicola (2015) estimated that weather index insurance could improve average household food consumption by 17%.

In summary, index insurance has clear potential to play both *protection* and *promotion* roles in relation to farmer livelihoods. This raises the question of how opportunities for product development can be captured.

3. Challenges and opportunities to scaling up agricultural adaptation through insurance

While index insurance has gained increasing attention within the international development community there are many challenges to making it work at scale. Because of the complex nature of these challenges and the marginal contexts within developing countries in which the product is being rolled out, overcoming them requires concerted effort by stakeholders from across the insurance, agriculture and climate change sectors. We highlight these challenges and identify how the insurance and agricultural research communities can work together to turn them into opportunities.

Data availability

Index insurance works best where losses are homogeneous in the defined area and highly correlated with the indexed peril. The benefits of index insurance to the insured ultimately depend on the statistical relationship between the indemnities provided by the insurance contract and the losses suffered by the insured: the greater the correlation, the greater the potential benefit. While it is impossible to entirely eliminate basis risk from index insurance products, it is critical to minimize it through careful index selection, cross-validating the index using several data sources, including farmers' input through participatory processes, and designing a contract that maps the index data to historical and anticipated patterns of losses (IRI 2013).

Index insurance needs place-specific data so that good indices can be calculated and used. However, data limitations are severe, especially when it comes to historic rainfall data. Much can be gained in investing in agro-meteorological research to identify weather indices that minimize basis risk for as many households as possible. ICT and the data revolution can be harnessed to improve index insurance so it better captures the risks that are important

to farmers. Weather stations are increasingly established at lower cost but additional weather stations still add to the expense of developing and marketing insurance contracts. Furthermore, new weather stations come without site-specific historical records, and often require the calculation of “synthetic” data sets (e.g. based on the triangulation of data from nearby weather stations).

The absence of sufficient weather stations in many countries has led to interest in indices that do not require local weather station data at all, but which correlate highly with production or asset losses by farmers. Area-based yield insurance is seen as an alternative, although as an index it suffers because official yield measurements can be unreliable or biased, and are often reported late after the harvest, leading to delays in payment. There has also been a lot of recent innovation in developing indices that can be assessed remotely with satellites, such as cloud cover, vegetation cover, or soil moisture content for a chosen region during critical agricultural periods. Such data are sometimes linked to a biophysical or statistical model that relates the remotely sensed data to the agricultural losses to be insured. For example, the Index Based Livestock Insurance (IBLI) project has developed a remotely-sensed vegetation index calibrated against mortality survey data to insure livestock mortality losses in pastoral areas of Northern Kenya (Mude et al., 2010). Some of these satellite products include station data where available.

Advances in remote sensing, agricultural modeling and “big data” analytics are expanding the range of options for capturing the risks that are important to smallholder farmers, and for reducing basis risk, but have yet to be fully tested and exploited. The European Union’s new satellite system Sentinel-2A could be a game changer for the types of indices that can be developed and monitored around the developing world. The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) Remote sensing-based Information and Insurance for Crops for Emerging Economies (RIICE) project has pioneered a radar satellite data-based system that allows for accurate and timely measurement of planted areas and yields for rice in Asia (Hess and Hazell, 2016).

Key message - Absence of data is a key hurdle that needs to be addressed for index insurance to achieve scale; new opportunities are arising through Information and Communication Technology (ICT) and the data revolution.

Targeting and design of insurance

Farmers are not homogenous. The diversity of smallholder farmers’ needs requires different insurance solutions. In some cases insurance may not be an appropriate intervention. How do we develop insurance that targets men and women farmers’ context-specific needs, packaged at the right scale (e.g., individual farmer, aggregator, national government)? How do we identify which farmers should be targeted for insurance while recognising those for whom insurance is not appropriate? And how do we ensure that insurance is packaged in a way that complements men and women farmers’ livelihood needs in ways that can be integrated into their on-going climate adaptation and climate service initiatives?

Agricultural researchers and development practitioners have developed various livelihood frameworks that can be helpful in targeting the sorts of farmers who are most likely to be receptive to insurance and these have been integrated into recent policy approaches to the

agricultural sector (e.g. DFID, 2015). Meanwhile, Oxfam, the UN World Food Programme and partners have been exploring a scheme that allows very poor farmers to take out insurance in return for labor. Eligible farmers in Ethiopia, Senegal, Malawi and Zambia can enroll in insurance programs through Insurance-for-Assets (IFA) schemes in which they get insurance coverage in exchange for their work on resilience-building activities in their community.

Furthermore, bundling insurance policies with other financial services such as credit can also lessen the cost burden, allowing the premium to be factored into interest. This softens the blow for smallholders who have limited access to capital. Another reason possible limiting demand is that index insurance is typically only offered to farmers, and often only to farmers growing particular crops or livestock. Index insurance can also be used to insure actors others than farmers. Agricultural value chains are such that many other types of chain actors e.g., agricultural traders and processors, landless workers, and village shopkeepers who are dependent directly or indirectly on local agriculture, and whom in turn can be adversely impacted by a drought and reduced agricultural production.

Key message - For index insurance to achieve scale it needs to be appropriately targeted, this means recognizing heterogeneity in farmer populations and designing insurance products that best meet the needs of specific farmer-groups.

Distribution channels and use of technology

Farmer demand for insurance will be weakened if there are lengthy forms to be filled out or special journeys to make to register or receive a payout. The power of technology and big data can be harnessed to make the payment and claim processes even more simple and timely. Some insurers are taking advantage of mobile phone and mobile banking technologies. A good example is the ACRE program in East Africa, which enables farmers to pay their insurance premiums and receive payouts via the M-PESA mobile banking system (Hess and Hazell, 2017). Using weather triggers such as rainfall to make an automated payment to insured farmers using mobile finance services such as M-PESA in Kenya can make insurance a much more attractive proposition for farmers. One challenge of using mobile phones is to ensure that the technology reaches both men and women, considering that mobile phones are still mainly owned by the head of the household (often a man) in many countries.

Few private insurers have the required distribution networks in rural areas so they often work through an intermediary with an existing network of their own (e.g., a microfinance institution, bank, input dealer, agro-processor, or NGO), or they work with groups of farmers who can be insured as single entities. Farmers may not understand or trust the insurance, especially when it is new, and this adds to the perceived risk of buying it. The existence of *basis risk* means that transparent communication is crucial for trust. But index technologies that reduce basis risk can be more complex, and hence more challenging for farmers and other stakeholders to understand and trust. It is important to market the insurance through existing distribution channels that farmers use and trust, such as microfinance or input suppliers.

Communicating what is a complex product – index insurance – to farmers and other stakeholder requires much time investment. Appropriate training and participation of farmers in the process from the start are crucial to building their trust in the eventual insurance products. The process includes giving farmers a voice in insurance design as this can improve uptake and satisfaction. Participatory methods that have proven effective, however, are challenging to scale up. How can farmers' needs and realities be incorporated into the design of tailored solutions at scale, in a cost-effective manner? To what extent does ICT and especially mobile phones allow for farmers to play a greater role in product development?

A focus on distribution channels also raises the issue of how the insurance is best marketed i.e. at a micro-, meso- or macro-level. There are distinct advantages to focusing at the meso-level, not least that basis risk is much less of a problem when an index is being used to insure a relief agency (or indeed a microfinance institution or agricultural input supplier) since the insurance would be underwriting a regional or national portfolio that has already aggregated farm level variation. Insured groups of farmers can also pool basis risk among themselves.

Key message - It is importance to market the insurance through existing distribution channels that farmers use and trust, such as microfinance or input suppliers; opportunities also exist to market insurance at the micro-, meso- and macro-levels and to take advantage of mobile phone technology.

Bundling index insurance with climate smart agriculture & others types of insurance

Farmers do not value insurance that might not compensate them when they have a loss for which they think they are insured. This is the basis risk problem. Many programs link the insurance to credit, access to modern inputs and better technologies, or to a better market outlet (e.g., contract farming), all of which can make the insurance part of a real value-adding proposition for insured farmers that extends beyond the value of its direct risk-reducing benefits (Hazell and Hess, 2017). This has led to successful cases where index insurance is packaged with other types of insurance that farmers find attractive, such as life or accident insurance. NWK AgriServices in Zambia has built weather and life insurance into its cotton farming contracts, in order to enhance farmers' loyalty and deliveries, and secure them against debt and livelihood problems in case of weather failures (Hazell and Hess, 2017).

Successful agricultural index insurance initiatives treat insurance as just one component of agricultural risk management, and some bundle insurance products within credit or technology packages. Hess and Hazell (2016) give the example of Zambia, where farmers also emphasized the need for insurance to be embedded in the entire agricultural value-chain. For example, farmers wanted access to better quality farming inputs and also emphasized the need for better irrigation, mechanization and other investment in order to cope with production and post-production risks and also to increase their productivity. This provides an opportunity to link index insurance with a number of climate smart agricultural technologies and practices, e.g. drought tolerant crop varieties that agricultural researchers

have been developing. This raises the question as to how to identify the most suitable climate smart technologies and practices in a given context?

The issue of bundling also provides an excellent opportunity for those engaged in agricultural research to work more closely with the insurance community. Agricultural research have over the last two-three decades developed many climate smart agricultural technologies and practices, such as drought tolerant crop varieties, that lend themselves to being bundled with index insurance products and, hence, contributing even more to climate change adaptation and mitigation.

Key message - There is growing evidence that bundling index insurance with credit, climate smart technologies and/or life insurance can make it a real value-adding proposition for farmers and increase farmer demand.

Regulatory environment

There are three types of agents that are active in providing agricultural insurance: the private for profit sector, governments (public), and other, mostly nonprofits such as NGOs, etc.). Other agencies help finance and initiate insurance programs, including bilateral donors, United Nations (UN) organizations and multinational development banks. Recent years have seen the growing involvement of nonprofit organizations in providing insurance targeted at poor people. They have their own networks for distributing insurance to farmers. Since most of these organizations are not licensed to sell insurance, they inevitably partner with private insurers who provide and underwrite the insurance contracts.

Developing insurance industry capacity to scale index insurance for smallholder agriculture requires attention to incentives, support through public-private partnerships, and conducive regulatory frameworks. In low income countries where index insurance is expanding achieving these aspects can prove challenging. Sometimes insurers use their own networks to sell insurance directly to farmers, but more often in developing countries they work through other players along value chains who sell directly to farmers. For example, they may link up with agro-processors, input suppliers, or seed companies that offer farmers insurance along with credit, seeds, fertilizer, or contract farming arrangements.

An advantage for private insurers is that these partnerships give them access to farmers whom they might not otherwise be able to reach, often in aggregated form e.g. farmer groups, and the nonprofit will typically do most of the work and market, service and subsidize the insurance. There may also be important public roles that need to be met, without which the private insurers face high setup costs and barriers to entry. For example, the high initial investment costs in research and development of index insurance products might not be recouped, given the ease with which competitors can replicate such products if they prove profitable to sell.

Establishing a legal and regulatory environment for enforcing contracts that both buyer and seller can trust is a fundamental prerequisite for index insurance. Additionally, laws and regulations need to be consistent with international standards to improve the chances of insurers gaining access to global markets for risk transfer. It is critical that the insurers have

access to appropriate reinsurance coverage. Laws and regulations must harmonize with international standards to improve the chances of insurers gaining access to global markets for risk transfer.

Key message - Establishing a legal and regulatory environment for enforcing contracts that both buyer and seller can trust is a fundamental prerequisite for index insurance; opportunities are provided by innovative public-private partnerships that bring together government, local insurers and international reinsurers.

Enabling environment and smart subsidies

There are important roles for the public sector in promoting index insurance and facilitating greater involvement of private insurers. These include creating an enabling regulatory environment, investing in weather stations and agro-meteorological research and data systems, educating farmers about the value of insurance, and facilitating international reinsurance. There may also be a need for smart subsidies to correct initial market failures and externalities that hold back the development of markets for index insurance products. Temporary subsidies to overcome initial setup, first mover, or other market failure problems that can arise when an insurance market is first emerging may be justified. There should be an explicit exit strategy or strategy for long-term financing.

Insuring against agricultural risks is expensive. In many countries, catastrophic events like droughts can occur with sufficient frequency, so that premium rates may need to exceed 10–15 percent just to cover the pure risk cost of the insurance (i.e., the average compensation expected). Subsidies will usually be less distorting if made directly to the insurer to offset administration, infrastructure, and development costs rather than subsidizing the premium rates paid by farmers. Premium subsidies may encourage farmers to grow unsuitable crops in risky environments, leading to net social losses and adding to the future costs of insurance and the size of the subsidy.

There are other innovative ways to deal with farmers' inability to pay for a premium. Index insurance is designed to cover the biggest risks faced by farmers. Smaller risks are more efficiently addressed through a range of cheaper risk-management strategies; index insurance is expected to be the last recourse but its products can be expensive. Initiatives such as the 'work for insurance' strategies developed by Oxfam and the World Food Program can help tackle this challenge by not requiring a payment in cash. Requiring farmers to invest either some time or money in the insurance product reinforces the critical condition that the product remains affordable and responds to farmers' needs, which can be seen as an incentive for quality.

Some government disaster assistance programs have been able to purchase international reinsurance to cover part of their expected assistance payments. The assured and timely payments received from a reinsurer, when a disaster occurs, can help avoid some of the delays and uncertainties incurred in obtaining emergency funding from government and/or donor sources. Reinsurance can also help smooth out the annual cost of a disaster assistance program to government and/or donors in the form of a predictable and regular annual premium since a disaster assistance agency aggregates losses to regional scales, it is

much less troubled by basis risk problems than when index insurance is written for individual communities or households. (Hess and Hazell, 2016).

Key message - Careful attention needs to be paid to how an enabling environment for farmer up-take of index insurance can be built in order to ensure confidence in the product; in some cases smart subsidies may be required alongside government commitment to regulatory reform to enable index insurance to be a tool of poverty reducing potential.

Impact evaluation

Based on a recent review of documented index-based agricultural insurance programs in the developing world, Hess and Hazell (2016) estimated that about 198 million farmers are insured, divided into approximately 650,000 in Africa, 3.3 million in Latin America and the Caribbean, and about 194.2 million in Asia – of which 160 million are in China and 33.2 million in India. These figures suggest that one-third of the farms in the world have some kind of agricultural index insurance.

A sound body of evidence should inform investment in index-based agricultural insurance, but insurance is a challenging intervention to evaluate. While beneficial impacts have been demonstrated in several smallholder agriculture settings, evidence about degree of demand and the potential for scaling remains mixed and controversial, especially when it comes to equity in terms of what types of farmers are best able to access insurance and whether the insurance product diminishes or exacerbates inequalities in farming communities. Sceptics of index insurance refer to ‘low’ uptake of index insurance and quote figures of 20-30%, but such uptake levels are not too dissimilar to the adoption figures for other agricultural innovations. The other important issue is that such adoption figures make less sense when one factors in the farmers covered by meso-level and macro-level index insurance schemes.

Where more work is needed is on documenting the size of the private and social benefits conferred by the insurance. This would help guide decisions about when some public financing might yield a positive net social return. A few studies have examined farmers’ uptake of index insurance when linked to credit and technology packages, and of the socio-economic determinants of that demand (Carter et al, 2016), but there have been very few ex post impact studies to show their full impacts. We simply do not know enough about how index insurance has changed farmers’ livelihood strategies and incomes or how protecting lives and assets has enabled people to avoid or escape poverty. Nor do we know how index insurance has impacted on financial institutions and agro-dealers etc. and whether it has enabled them to expand their businesses by serving more small farmers. It will be important to build more long-term monitoring and evaluation (M&E) components into future index-based insurance programs and this is again an area where the insurance and agricultural research communities could work very effectively together.

Key message - Ex-post impact studies are needed to demonstrate impact, including whether and how index insurance has transformed farmers’ livelihood strategies and incomes; evidence is also needed on the impacts on financial institutions and agro-dealers, including whether it has enabled business expansion by serving more small farmers.

Capturing the full value chain

Another factor that may be limiting demand is that index insurance is typically offered only to farmers, and often only to farmers growing particular crops or livestock. Index insurance has the potential to insure many other types of rural people, who are engaged in nonagricultural activities that depend directly or indirectly on local agriculture – for example, agricultural traders and processors, landless workers, and village shopkeepers. One example of this broader insurance approach is the Livelihood Protection Policy (LPP) in the Caribbean. This insures non-salaried income earners against adverse weather events, such as high wind speed and/or excessive rainfall (Hazell and Hess, 2016). The insurance does not need to be tied to specific crops and can in principle be sold to anyone. This raises the possibility of insuring anybody in a region whose income is correlated with the insured event, including but not confined to farmers.

Key message - Insurance has tended to be offered largely to farmers but there are opportunities to offer insurance to actors who are engaged in non-farm activities such as input suppliers and traders.

4. Moving forward

Index-based insurance is a promising innovation that has the potential to scale up agricultural insurance to benefit millions of smallholder farmers, as well as help underwrite many public relief programs. It also promises to increase the engagement of private insurers in managing climate risks, either directly or through various kinds of public-private or nonprofit-private partnerships. The vision of this conference is that:

“All men and women farmers have access to insurance and that it forms part of a package of information-finance-technology that shifts agriculture to a new level; helping farmers to deal with climate change. Digital agriculture will be at the core of this vision, linking insurance products, banking services, weather advisories, agricultural extension and market information. Through improved input use, greater productivity, and the protection of harvests and assets, the footprint of agriculture will be reduced; and livelihoods will be improved and made more resilient”.

This conference brings together the insurance, agriculture and climate change communities to highlight the value of index-based insurance, draw lessons and identify key challenges for effective scaling up of index-based insurance as a climate change adaptation action.

This vision can be realized: integrating insurance, big data and agricultural innovation (the themes of the conference) provides exciting opportunities for scaling-up index insurance as a climate-smart agricultural innovation.

With the active participation of the conference attendees we can map out new partnerships and emerging innovations that offer promising solutions to the big challenges and opportunities highlighted in this background paper, and that provide a pathway towards elevating the contribution of index insurance to smallholder adaptation to a new level.

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